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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,854	09/02/2004	Michael Bock	BOS0067	4503

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EXAMINER	
PILKINGTON, JAMES	
ART UNIT	PAPER NUMBER
3682	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/506,854	BOCK ET AL.	
	Examiner	Art Unit	
	JAMES PILKINGTON	3682	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Prosecution Application

The RCE filed on 7/28/08 is acceptable and an action on the RCE follows.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-11 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami et al, USP 6,550,567, in view of Fleytman, USP 6,098,480.

Murakami discloses a worm gear for a vehicle steering system comprising:

- A shaft (attached to worm gear 71) swivably mounted for swiveling in the radial direction (in the direction of Y)
- A worm (71) disposed in a rotationally fixed manner on said shaft (71 is part of shaft)
- A worm wheel (72) preloaded in the radial direction (meshing with teeth of worm causes some preloading)
- A housing (8)
- A fixed bearing (11)

- A loose bearing (10, moves inside and relative to 22 via elastic members 20)
- A slot (81)
- A support ring (22), said loose bearing (10) bears against said housing (8) via said support ring (22, 20 connects the bearing to the ring, the ring connects to the housing)
- A spring element/anti-twist device (20, elastic member) disposed between the loose bearing and the housing (via the support ring 22). It is to noted that the spring and anti-twist device are the same device as disclosed by the applicant on pg 8 ln 14 of the specification submitted on 11/4/04.
- The spring element is a plate spring (Fig. 8 shows the elastic member 20 as a plate spring), or a leaf spring (Fig. 5 shows the elastic member 20 as a leaf spring connected to the housing via the support ring)
- A motor (6)
- The worm (71) is cantilevered on the shaft (see Fig. 4)
- The shaft is mounted in the housing (8) by means of rolling bearings (fixed bearing 11)

Murakami does not disclose that the worm wheel has teeth that have different pressure angles on the left and the right so that the normal force

between said worm and said worm wheel is independent of the direction of rotation of a torque exerted on said worm by said worm wheel.

Fleytman teaches a gear (34) that has teeth that have different pressure angles on the left and right (Φ_{g1} and Φ_{g2}) so that the normal force between said worm and said worm wheel is independent of the direction of rotation of a torque exerted on said worm by said worm wheel for the purpose of providing an assembly which has improved efficiency and component life, is quieter, has higher torque handling capacity, improved weight savings and packing, and reduces effect of shock loading (C2/L12-18).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Murakami and provide a gear that has teeth that have different pressure angles on the left and right so that the normal force between said worm and said worm wheel is independent of the direction of rotation of a torque exerted on said worm by said worm wheel, as taught by Fleytman, for the purpose of providing an assembly which has improved efficiency and component life, is quieter, has higher torque handling capacity, improved weight savings and packing, and reduces effect of shock loading.

3. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami ‘567 in view of Fleytman ‘480 and further in view of Lu et al, USP 6,046,560.

Murakami in view of Fleytman discloses all of the claimed subject matter as applied to clms 1-11 above and Murakami also discloses that the motor (6) has an output shaft (12).

Murakami in view of Fleytman does not disclose that the motor has three-phases and FET's are used to short-circuit at least two phases.

Lu teaches that a motor has three phases (Aa, Bb and Dd) and FET's (switches) are used to short-circuit the phase (turn the phases on and off C9/L39-C10/L12) for the purpose providing a motor that has the capability of adjusting current through the phase to assist in the steering of a vehicle (C10/L11-12).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the teachings of Murakami in view of Fleytman and provide a motor has three phases and FET's are used to short-circuit the phase, as taught by Lu, for the purpose providing a motor that has the capability of adjusting current through the phase to assist in the steering of a vehicle.

Double Patenting

4. Claims 1-11 and 14 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of U.S. Patent No. 6,860,829 in view of U.S. Patent No. 6,098,480 to Fleytman. Claims 1-11 and 14 of USP 6,860,829 discloses a worm gear for a vehicle steering system which comprises a shaft, a worm, a worm wheel, a housing, a fixed bearing, a loose (moveable) bearing, a support ring, and a spring element. Claims 1-11 and 14 do not disclose that the worm wheel has teeth, each said tooth having right and left tooth flanks which are inclined at respective pressure

angles that are different between the left and right flanks (Fleytman, Φ_{g1} and Φ_{g2}). In view of the teachings of Fleytman it would have been obvious to one having ordinary skill in the art to modify claims 1-11 and 14 of USP 6,860,829 and make the gear teeth with different pressure angles on the left and right side of the teeth, as taught by Fleytman, for the purpose of providing an assembly which has improved efficiency and component life, is quieter, has higher torque handling capacity, improved weight savings and packing, and reduces effect of shock loading (C2/L12-18).

Note: Re the phrase "adapted to" claim scope is not limited by claim language that suggests or makes optional but does not require steps to be performed, or by claim language that does not limit a claim to a particular structure. See MPEP 2106 and 2111.04

Response to Arguments

5. Applicant's arguments filed 7/28/08 have been fully considered but they are not persuasive.

6. The Applicant argues that Fleytman is not a valid reference since Fleytman does not disclose "that the normal force between the worm and said worm wheel is independent of the direction of rotation."

The claims do not recite any structure of the two pressure angles that defines this normal force relationship. As broadly defined any gear can have this feature if the gear teeth of the worm are identical around the circumference, the

gear teeth of the worm wheel are identical around the circumference and the two gears are held so that they do not disengage with each other. If these three conditions are satisfied, which they are in Fleytman, at every point of full engagement of the two teeth the normal force will always be the same regardless of the direction of rotation. Since the normal force at full engagement will always be the same, regardless of the direction of rotation, the normal force is indeed independent of the direction of rotation.

7. The Applicant argues that Fleytman is not a valid reference since it is not a bidirectionally driven worm gear.

First, the claim does not require that the worm gear must be a bidirectionally driven worm gear. The Applicant states that the limitation "so that the normal force between the worm and the worm wheel is independent of the direction of rotation of a torque exerted" requires that the worm be bidirectionally driven. This does not require that worm be bidirectionally driven, the only requirement from this limitation is that the normal forces be independent of the direction of rotation and since the normal forces between the two gears in Fleytman do not depend on the direction of rotation they are independent from it.

Second, if the claim where to require a bidirectionally driven worm gear Fleytman does indeed disclose this. Fleytman discloses that the gear is used to power a drive axle of a vehicle. If the worm was not a bidirectional worm then the vehicle would only move in one direction. In addition, the Applicant is relying on the phrase "typically, the drive side of the gear tooth receives loading while

the coast side does not" as evidence that worm is not a bidirectional worm. This does not say that the gear is not a bidirectional worm. This phrase only says that it the drive side typically receives the load, but it does not limit it to only being received by the drive side.

Conclusion

This is a RCE of applicant's earlier Application No. 10/506854. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Pilkington whose telephone number is

(571) 272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. P./
Examiner, Art Unit 3682
8/5/08

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3682